

Case Study No. 5 Waterborne Coatings

Back to the Woods

Redlands, CA

Background

Back to the Woods is a small custom furniture shop. The owner, Mr. Kevin Lura, has one part-time employee. Mr. Lura builds and finishes custom furniture, such as tables, desks, chairs, shelves, and other items. He has been making furniture for about 15 years. He switched to waterborne coatings to avoid the health and fire risks associated with the use of solvent-borne coatings.

Manufacturing and Coating

Mr. Lura manufactures furniture in his shop. He most often uses quartersawn oak, because he likes the high-end appearance, and sands all pieces before they are coated. To minimize the effects of grain raise from the waterborne coatings, he has experimented with wetting the piece to induce grain raise, sanding it, and then coating. Pieces are finished in the area of the shop nearest the door, and cardboard is used to catch any overspray. Finishes are sprayed with an HVLP gun from a small pot. Mr. Lura no longer uses a spray booth to finish, since the waterborne coatings are non-toxic and non-flammable.



Product sample

A stain and two coats each of sealer and topcoat are typically applied. The stain is sprayed, then wiped and allowed to dry. Mr. Lura uses three main stain colors, but expects to start mixing his own custom colors as his business expands. If color matching is required, he either applies two coats of stain or dilutes the stain with water to achieve the desired color. Two coats of sealer are applied, with dry time after each coat, and then sanded using Scotch Brite™ pads. Two coats of topcoat are applied and allowed to dry after each coat. The sealer and topcoat are applied sparingly to prevent long dry times. Since the waterborne coatings are high-solids coatings, he does not apply as much coating on each piece as he did when he used solvent-borne coatings. Cleanup is accomplished using hot water.

Conversion to Waterborne Coatings

Mr. Lura previously used solvent-borne coatings, but wanted to switch to waterborne coatings because of the smell, and to reduce health and fire risks. He did not want to switch to acetone-based coatings, because of the smell and fire risk. The first

waterborne sealers and topcoats he tried several years ago plugged the spray gun and caused excessive grain raise. As noted above, Mr. Lura has experimented with prewetting to control grain raise, which is an issue with the quartersawn oak he uses for many of his products. Increased dry time of the clearcoats was an issue.



Product storage

Mr. Lura began working with Western EcoTec Coatings in 1997 to develop a coating system customized to his needs. At first, the waterborne stains produced a muddy appearance that was undesirable, but their appearance has improved with reformulation. He now uses waterborne products exclusively, except for a few stain colors that are not yet available in the waterborne products.

The quality of the finish has improved as Western EcoTec has adjusted the coatings and Mr. Lura has adjusted his application technique to the waterborne coatings. Now that the waterborne stains produce the desired appearance, Mr. Lura stated that they are actually easier to work with, as far as diluting them to achieve the desired color or appearance. He had problems with a few tables he finished, but experimentation with diluting and finishing techniques has overcome these problems. However, adjustments are necessary to account for the fact that waterborne stains tend to bring out a green tint in the wood, while solvent-borne stains tend to bring out a brown tint. Mr. Lura also remarked that the appearance of the stain improves when the sealer is applied, and it sometimes takes 24 hours for the true color to emerge.

He initially had problems caused by applying too much sealer or topcoat. Less of the waterborne coating is required to produce the desired film thickness, since the solids content is high. Too much clearcoat tended to result in a very long dry time and a blue hue. In addition, the waterborne coatings do not “melt” into themselves when a thick coat is applied, like the solvent-borne coatings do (this also tends to complicate rework). When he adjusted the amount of clearcoat he was applying, the dry time and appearance improved. Mr. Lura is very satisfied with the waterborne coating system he is currently using, and says the extra effort and the learning process is well worth the reduced health and fire risks. As he has experimented with application techniques, the quality of the final product has improved, and will continue to improve.

Costs

The coating cost per gallon has remained essentially the same. However, since the waterborne coatings have a much higher solids content than traditional solvent-borne coatings (around 28 percent for the sealer and topcoat), less coating is needed for each piece. Using the HVLP gun also results in a material savings, because of the higher transfer efficiency associated with the gun’s use. The use of a ventilated spray booth and the associated operating costs also have been eliminated.

Emissions

Back to the Woods is located in an ozone nonattainment area. However, Mr. Lura currently uses less than 100 gallons per year of coatings. Therefore, he is not subject to any emission standards or VOC limits. The waterborne coatings he uses all have a VOC content of less than 275 grams per liter and contain no HAPs.